ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY
INTERVIEW WITH
C. NEIL BASS

BY - CHARLES W. CRAWFORD
ORAL HISTORY RESEARCH OFFICE
MEMPHIS STATE UNIVERSITY

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INTERVIEW WITH C. NEIL BASS

JULY 9, 1969

BY CHARLES W. CRAWFORD

ORAL HISTORY RESEARCH OFFICE

MEMPHIS STATE UNIVERSITY

BASS, C. NEIL

MEMPHIS STATE UNIVERSITY

ORAL HISTORY RESEARCH OFFICE

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PLACE Washington, D.C.

DATE July 9, 1969

C. Neil Bass
(Interviewee)

Charles W. Crawford
(For the Mississippi Valley Archives
of the John Willard Brister Library
of Memphis State University)

(OHRO Form B)

THIS IS MEMPHIS STATE UNIVERSITY ORAL HISTORY RESEARCH OFFICE PROJECT IN THE ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY. THE DATE IS JULY 9, 1969. THE INTERVIEW IS WITH MR. C. NEIL BASS OF WASHINGTON, D. C. THE PLACE IS MR. BASS' OFFICE IN THE MAIN STATE DEPARTMENT BUILDING, WASHINGTON. THE INTERVIEWER IS DR. CHARLES W. CRAWFORD, DIRECTOR OF THE ORAL HISTORY RESEARCH OFFICE AT MEMPHIS STATE UNIVERSITY, MEMPHIS, TENNESSEE.

DR. CRAWFORD: Mr. Bass, the interview today concerns the history of the Tennessee Valley Authority and specifically your part in the development of TVA. I would suggest that we start with a summary of your career, that is, your boyhood, your experiences before your service with the Tennessee Valley Authority. Then let us proceed to your career with the Tennessee Valley Authority.

MR. BASS: Thank you, Dr. Crawford. I might say at the outset that I'm very glad to participate in your program of recording some of the experiences that those of us had in the early days of the Tennessee Valley Authority. At the time the TVA was created, I was city manager of Knoxville, Tennessee. You may recall that at that time the city government had what we called the "true form of city management." That is the city manager was elected by a board of councilmen which in turn had been elected by a popular vote in the city. It was a non-political job done on a professional basis. Before that I had been in private engineering practice. During the period from the time that I graduated from the University of Tennessee in 1919, until 1928, I had been with the Tennessee State Highway Department. The last three years, from 1925 to 1928, I

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MR. BASS: (Cont'd.) was the Commissioner of Highways for the state, serving by appointment from Governor Austin Peay. I look back on the recollections of highways career with much pleasure because I was fortunate to be in that work at the time of the transition from no roads to roads. The Highway Department became a very popular instrument of government in Governor Peay's administration. While serving as city manager the depression hit our city at Knoxville, and we really had a difficult time. All of the banks in the city failed. Earnings were low by the people in the city. They were unable to pay taxes. One of the little devices that we used was to print city warrants, which turned out to be very successful. The warrants were used to pay city employees and city bills. These warrants, in turn, were used to pay city taxes. So we were very receptive to the approach that the President of the United States, Mr. Roosevelt, made at the time that he proposed the Tennessee Valley Authority. We read with much interest the proposal to create an agency that would have the freedom of private enterprise and yet have governmental responsibility for the integrated development of the resources of the Tennessee Valley region. I was among those who enthusiastically applauded the move in Congress to set up a Tennessee Valley Authority. I had no idea at that time that I would become associated with the Authority and that I was to be one of the earlier employees of TVA. This came about by the people selected to the Board. They were Dr. Arthur Ernest Morgan, a man of recognized stature in the educational and engineering fields, and Dr. Harcourt Morgan, President of the University of Tennessee, a man whom I had known during my college work and later in my work with the Highway Department and as city manager of Knoxville. I became a close friend of Dr. Morgan, and we knew each other

MR. BASS: (Cont'd.) quite well. The third member was Mr. David Lilienthal, a member out of the public utility regulation field and an attorney. These men offered to us in Knoxville the assurances that TVA would be an agency which would be devoted to the public service for which it was created. These assurances were confirmed early in the history of TVA. I recall that I was present at the second meeting of the TVA Board and the first held in Knoxville in the Chamber of Commerce Board room. The other two persons present at this meeting, besides the TVA Board, were the manager of the Chamber of Commerce, Mr. Clarence Holland, and myself, representing the city government. It was our purpose in attending the meeting to offer the full cooperation of the city and the community to the new agency. Soon after the Board was getting in operation in late July or early August of 1933, Dr. Harcourt Morgan approached me to see if I would consider resigning from the city and becoming his principal assistant. After some careful thought I decided, for a number of reasons, that this would be a challenging opportunity.

DR. CRAWFORD: When was that invitation? Was it in the summer of '33?

MR. BASS: That was in early August, 1933. In fact, I worked out my resignation with the City Council and recommended a successor, and went to work for the TVA as Dr. Morgan's assistant on August 15, 1933. Just at that time TVA was setting up its offices, recruiting staff, forming policies and programs; and I must admit, with the usual confusion that comes with the early organization of an agency with such broad scopes and responsibilities as the TVA had. I would like to say something at this point about the TVA organization and staff. There was no historical pattern for an agency of this type. The Board members had to make decisions in

MR. BASS: (Cont'd.) the midst of a daily busy program as to how the agency would be set up, what their operating policies would be, how it would be staffed, and how the program would be gotten underway. The broad mandates of the Authority left a lot of discretion to the Board. That is, the Authority was directed by the Congress to develop the natural resources of the regions for their best use, for the economy of the region, and for the United States as a whole. The TVA area is rich in a diversity of resources. The soil resources, the forest resources, and the economic activity in general was much below the potential. The TVA's thinking at the moment was how we could organize the program and mobilize the effort in the Valley to really utilize and develop this potential to the greatest extent possible. There were several key initial decisions to be made in the approach to resource development in the Tennessee Valley. First we had to decide on the territorial limits within which we would work. That was pretty clearly defined in the Act in saying that the primary interests would be the Tennessee Valley watershed and the resources within that area. So, TVA, as one of its first decisions, decided to define the TVA area for the purpose of resource development as those counties lying within, or partly within, the Tennessee Valley watershed. That comprised some 125 counties as I recall, in the seven states, parts of which were in the Tennessee Valley watershed area. You are familiar with those states. They are Kentucky, Virginia, North Carolina, Georgia, Alabama, Mississippi, and Tennessee. One of the early decisions, also, had to do with what sort of a program would we set up to develop resources. The mandate was pretty clear in the Act that the Tennessee River itself, the water resources of the River and of the watershed area, should be developed to the highest potential. One of the requirements in the development

MR. BASS: (Cont'd.) of the water resources of the region was that a navigation channel would be developed for the main stem of the River. Another mandate was that the floods of the region would be controlled to the extent feasible. Another provision in the Act was that the TVA would utilize the electric power from the development of the water resources of the region. To create hydroelectric power and to make a navigation channel in the River would require a series of dams to canalize the River. On the tributary streams, in order to control floods, it was of course necessary to create storage reservoirs to hold back the water until the floods were over and then release them in some regularized pattern.

An important adjunct at that time was developed out of the concept of Dr. Harcourt Morgan who made the point effectively that water control in the river channels was just part of the opportunity in the problem, and that if the agricultural and forestry practices in the region were developed according to scientific methods and good farming practices, the effect of holding water back on the watershed and controlling floods on the watershed areas would be very effective and would contribute to the utilization of the resources. That has a multiple effect, because water was one of the primary elements for crop production, and if the kind of crops and the kind of forests were developed under enlightened management, the effect of "water control on the land" (as Dr. Morgan called it) would be very effective.

At this point probably I should say something about the organization of the agency itself. The Board members compiled a list of the major activities as they foresaw them at that time. They divided this list into three general categories; one having to do with the engineering aspects of planning and developing the control of the rivers. This was primarily

MR. BASS: (Cont'd.) engineering and with mutual agreement, the responsibilities of this field were delegated to the Chairman, Dr. Arthur Morgan. A second general category of activities was those having to do with the sale of electric power. This second category was accordingly given to Mr. Lilienthal for his principal responsibility. Now, along with that, since Mr. Lilienthal was a lawyer, the direction of the legal staff was assigned to him. The third category had to do with the utilization of the World War I facilities at Muscle Shoals, Alabama.

These facilities comprised the nitrate plants which were built during World War I to give this country a source of nitrogen for explosive manufacture. I might say parenthetically that until World War I, the nitrogen supply of this country was derived largely from the import of nitrates from Chile, a natural nitrate deposit, and nitrogen refined from that material. The Germans, however, had developed a process for the synthetic fixation of atmospheric nitrogen. This country did not have the know-how that Germany possessed. The government felt that as an important part of national policy that it should develop that know-how. As a consequence of that decision, these two World War I nitrate plants were built at Muscle Shoals, Alabama, and had remained idle since their construction until TVA was created. As a part of the development at Muscle Shoals, one dam in the Tennessee River had been built, the Wilson Dam. It had been built during World War I to provide the main source of power to these nitrate plants in addition to a large steam plant which was built for a source of power until Wilson Dam could be completed. Now, regarding these nitrogen plants, the first was a cyanamid process, which was a known process but very cumbersome, that called for the separation of nitrogen and oxygen from

MR. BASS: the air through a process of compression at very high pressures.
(Cont'd.)
The second plant was the Haber process for the fixation of nitrogen. These plants had served the very useful purpose in that they provided the experimental results--the experimentation--on which the synthetic nitrogen industry in the United States was based. There had been a number of synthetic nitrogen plants developed in this country, and the U. S. had become self-sufficient in the production of nitrogen.

Now, nitrogen is one of the three major elements in commercial fertilizers for crop production, the other two being phosphorus and potash. Dr. Morgan approached the question of how to use these plants for their most effective use in a program of what we called " agricultural readjustment" in the Tennessee Valley to bring about the best use of agricultural resources of the TVA area and of the country. I think that at this point I could underline one of the major policy decisions of TVA that was proposed by Dr. Harcourt Morgan out of his familiarity with the land-grant colleges' facilities that were available in each of the valley states. That is, Dr. Morgan vetoed any idea that TVA would set up an agricultural program of its own to be carried out by TVA as a federal agency operating in the area. He chose, rather, to call together the agricultural colleges of the seven Valley states--their Deans of Agriculture, the heads of their experiment stations, and the heads of their extension services--and pose to them the problem and opportunity that was afforded by having these wonderful facilities at Muscle Shoals with which we could carry out a research program to improve and develop fertilizers that could be used in an agricultural readjustment program in the watershed.

MR. BASS: (Cont'd.) Dr. Morgan made it clear to them that it was their responsibility to formulate a program and submit it to the Authority for improved agricultural development in the region. The principles that were decided upon were very sound and very basic. That is, these college administrators and scientists said, in effect, that we have misused the soil resources in the region. The cropping patterns have been largely exploitive. The agricultural pattern had grown out of the historical growth of cotton in the South for industries not only in New England, but for shipment abroad. It was a basis of high prosperity in the South and in the country, but it was exploitive of the soil resources. Corn, too. The growing of corn, another row crop, called for the exploitive use of the soil. Fertilizers, up to that point of time, were generally used in the South and in the Tennessee Valley region to stimulate the growth of these row crops--cotton and corn--and crops of that nature. The reasons for this were valid and natural. But the soil resources had been gradually depleted to the point where farmers were having difficulty in maintaining their livelihood. A pattern of fertilizer use, according to the college administrators, should be developed to reverse this exploitive cycle. The decision that grew out of such a challenge was that what TVA should attempt to do was to make it possible for farmers to shift their farming practices, generally speaking, out of these row crops into types of farming that would conserve and rebuild the soil. For that purpose it meant that the whole pattern of soil management and farm management would be changed, you might say, into a pasture of livestock type of agriculture. Now, in order to support and make such a pattern possible, a different type of fertilizer practice would be required. That is, out of the three key elements of potash, phosphorus, and nitrogen,

MR. BASS: (Cont'd.) the key element in fertilizer use should become phosphorus or phosphate. And, as the college scientists pointed out quickly, with the proper applications of phosphate, along with lime which was abundantly available in the region, you could grow pastures and legumes through this natural process and provide the nitrogen needed for the soil through the growth of legumes. So the major conclusion was reached in this collaboration between the TVA and the land-grand colleges that the research at Muscle Shoals would be pointed, not to the development of nitrogen as a fertilizer, but to the development of phosphorus--phosphate.

Now, the opportunity to develop improved phosphate fertilizers was enormous. That is, the phosphate fertilizer that was generally used in the country, and of course, in the Tennessee Valley region, was practically all low-grade in which the nutritive part of the phosphate was only a small part of the tonnage applied as fertilizers, the remainder being inert material. This was the result of the method of making phosphate fertilizers, which was to acidulate natural phosphate rock with sulphuric acid. Abundant natural phosphate deposits occurred in Tennessee and sulphuric acid being derived from sulphur, from deposits mainly in Louisiana. But phosphate fertilizer thus made, was by its own nature a low-grade material. That is, it had about sixteen percent of its total weight in the form of P_2O_5, which is the useable phosphate element in fertilizer. It was scientifically known, however, that you could produce higher analysis phosphate by a number of different methods. One of the methods which was approached in the research program was to produce elemental phosphorus by combining the contribution of electricity and electric furnaces, and of convering the elemental phosphorus into phosphoric acid with which to acidulate the phosphate

MR. BASS: (Cont'd.) rock. Phosphate rock was available from a large area in central Tennessee, which had been the main source of phosphates for the country until the Western and Florida fields were developed. By using phosphoric acid in acidulating phosphate rock, a triple, super-phosphate, was produced which contained about 48% P_2O_5 as against the 16% in the ordinary methods. That was one of the processes. There were a number of other processes that were proposed in the laboratory to develop the know-how. One was to produce a product known as calcium meta-phosphate, which had 62% P_2O_5 content and still others were to chemically combine phosphorus and potash, particularly, and nitrogen, to produce high-analysis materials. So the research program was shaped. The research program to be carried out in fertilizer was shaped by the needs of the region and the needs to bring about a readjustment of agricultural practices.

Now, at this point in our interview, I would like to describe another decision that was a major one. That was how to obtain farmer acceptance to a new pattern of agriculture, made possible through the appropriate use of these more efficient high-analysis fertilizers. I think that the program that was evolved under the leadership of Dr. Harcourt Morgan is one of the outstanding contributions of TVA. It centered around the use of "test demonstration" farms. These would be school-room farms, selected by the farmers of a community to try out, under practical form conditions, how they might adopt these changed agricultural practices, and at one and the same time improve their farm operations, improve their economy income-wise, and conserve their soil resources and conserve their soil and water resources in their operations through this method of farming. Now, that called for persuading farmers to change their whole farm enterprise. This was, of

MR. BASS: (Cont'd.) course, a tremendous task of public relations. I think that TVA set a pattern that we can all point to with much pride. In the first place, TVA decided, (and the college group agreed) that the colleges themselves, through their research and extension staffs, would take major responsibility of preparing this program for the people. The approach was to have in each county in the Tennessee Valley enough agricultural advisors to be able to work on the scale required to bring about the adoption throughout all the Tennessee Valley this agricultural readjustment program. It was agreed among us that in addition to the County Agent, who was normally available in each county as the advisor on agricultural practices, that we would provide, through financial support of TVA, a second and sometimes a third County Agent in each county. Also, a very important part of the field staff would be a Home Agent to work directly with the people under the state extension service. Concurrently with this, the experiment stations of the several land-grant colleges would conduct soil experimentations with these new types of fertilizers on typical soils in the area. They would develop specific information as to the effectiveness of these fertilizers in the role of the kind of crops that would be needed and the pasture, live-stock economy.

So, through the County Agent extension organization the farmers would be asked to meet in each of the many communities of the Tennessee Valley counties. For instance, in the typical county in the Valley, perhaps there would be about twenty well-defined communities around community centers of a story and schools and churches. Perhaps in each one of these twenty typical communities there would be some forty or fifty farmers that would use this community as their natural meeting center. The County Agent would ask these

MR. BASS: (Cont'd.) forty farmers to meet over there to discuss the proposition of whether they would wish to join the effort that was led by TVA to bring about agricultural readjustment and a change in the Valley agriculture. The County Agent would explain that to do this there would be a major change in their farm practices. There would be a soil survey carried out by the U. S. Department of Agriculture of each county in the Valley. On the basis of the scientific evaluation of what crops could best be grown on what land, the farmers would be asked to replan their farms, largely with the purpose of shifting crops to the most suitable cropping areas; which, broadly speaking, would be getting row crops off of the sloping lands to the more level portions of the farm, re-fencing, and a complete change in their farm operations. This, of course, required some expenditure of money on the part of the farmer to bring about this change. Rather than to ask the farmers to go into it on a theoretical basis, it was decided to ask these forty farmers in the community to select one farm in the community which would be typically representative of all the farms of the community. This farm would be called a "test-demonstration farm," or a farm school for the community, and the test-demonstration farmer would agree to follow the cropping and fertilizer practices that were recommended by the County Agent. It was agreed, too, that for this particular farm owner the TVA would provide without charge these new types of fertilizers, and they could be economically tested under practical farm conditions. The farmer would be required to keep specific and accurate records of cost, production, and income so that the whole community could see from their own observation just the affect of these changes in agricultural practices. The other farmers in the community would be asked to meet at regular intervals on this test-

MR. BASS: (Cont'd.) demonstration farm to observe and see the result of this experimentation. So this test-demonstration approach, which was developed in the Tennessee Valley for the first time, to my knowledge, in the United States, became a teaching device to enable farmers to bring about the kind of a change in farming practices that has fostered the complete revolution of agriculture in the Tennessee Valley. Also, I might add parenthetically that the test-demonstration farm has been widely adopted over the United States, having had its inception in the Tennessee Valley region. Now, this type of approach that I have described in one community would be carried out in all twenty or so different communities in any particular county, and then carried out in all the 125 counties in the Valley. It became a very broad scale approach to agricultural readjustment in the Valley to bring about this readjustment objective that I have referred to earlier--and at the same time achieving water control on the land.

Since the laboratories at Muscle Shoals were also a national laboratory the proposition was made at the annual meetings of the National Association of Land-Grant Colleges and Universities that any university, through its college of agriculture and experiment stations and extension service could have available to them a reasonable amount of these high-analysis fertilizers to try out in the various farming regions over the United States. In addition to the intensive program in the Tennessee Valley, the test-demonstration program was thus carried out extensively in a great many states outside of the region. I don't remember exactly how many, but there were thirty or so.

Now, I want to come back just for a moment to the economy of and the affect of the high-analysis fertilizers and the effect this had on

MR. BASS: (Cont'd.) the fertilizer industry. Mineable phosphate ore occurs in isolated regions in the country, and the principal deposits being in Florida. The next largest deposits are in the Western states of Colorado, Utah, and Wyoming, and to a limited extent in Tennessee. The cost of transporting the phosphatic fertilizer from these isolated points of mining and manufacture to the farm represents a considerable part of fertilizer cost to the farmer. Well, it's simple mathematics that if you ship and use material that contains 48% phosphorus nutrient against 16%, your freight bill is cut to a third of what it otherwise would be. But the fertilizer manufacturers had the same problem that we had in the TVA area of getting farmer acceptance for the use of these high-analysis fertilizers. Farmer acceptance was facilitated in a very effective way through the test-demonstration programs that were carried on extensively over the country and the other states through the agricultural colleges. Now, (this many years later) high-analysis fertilizer is the rule, rather than the exception.

I must make one other reference to a major contribution of TVA in the field of fertilizers. I mentioned that we emphasized the development of phosphatic fertilizers, rather than nitrogenous fertilizers. But when World War II came along, those responsible for the military program found that it was very necessary to have nitrogen manufacturef for explosives. Ammonium nitrate, for which the plants had originally been built at Muscle Shoals, produced nitrogen useable for explosives. But ammonium nitrate was not in general production in the United States. There were insufficient quantities to supply the military. TVA was asked to modernize its ammonia plant to produce ammonium nitrate for explosives as one of the major sources of supply for military use. At the same time, under the

MR. BASS: (Cont'd.) War Production Board, a number of other synthetic ammonium plants were built and were put into operation to supply explosives. Very soon this country became self-sufficient through its private industries for the manufacture of nitrogen for explosives.

At that time and still during the war, TVA was asked to undertake a major research operation, and that was to make it possible to use this ammonium nitrate, which was itself a high-analysis fertilizer of, I believe, about 33% nitrogen content as against the lower-grade nitrates previously on the market of 16%, but ammonium nitrate had a quality that made it unacceptable to farmers. It was hydrascopic. That is, when you put it in bags and shipped it, it solidified. It would be very difficult, if not impossible, for farmers to use. So, TVA was faced with the problem of how to make this material into a free-flowing product that could be used as fertilizer. We did solve that problem. We converted the ammonium nitrate plant at Muscle Shoals to producing agricultural nitrogen fertilizer. Of course, I don't remember the capacity, but it approached 150 to 200 thousand tons a year. Interestingly, also, the War Production Board asked TVA, as the ammonium nitrate became surplus in the commercial plants, to furnish the nitrogen industry the know-how to convert many of the other synthetic ammonium plants into fertilizer production. So, as a result of that, TVA would send teams of its engineers and operators to a particular industrial plant at the request of the owner of the plant and help him to convert it into ammonium nitrate production as fertilizer. As a result of that the country soon had a plenteous supply of agricultural nitrogen, which was so vitally needed during the war period and which have remained in use through all of the years since. TVA found it necessary to continue

MR. BASS: (Cont'd.) the commercial production of nitrogen since there was a plentiful supply of commercial product of a high grade. So TVA discontinued the use of its plant, judging that it had fully served its purpose in this regard.

INTERRUPTION

MR. BASS: Speaking of this policy of TVA discontinuing its manufacture of nitrogen leads me to comment briefly on the policy that TVA adopted in making available to industry in general the processes that it developed in its laboratory and proved out. Of course, many of these processes were known theoretically before TVA would under-take their practical development. But it required a great deal of expertise to make the shift from theoretical knowledge into full commercial-sized production. After the chemistry was analyzed and developed, the next step would be to carry the process into a very small-scale processing plant to begin to develop the kind of equipment that was needed to produce the particular type of fertilizer. Then, when necessary, into a pilot plant perhaps one-tenth or one-fiftieth of commercial size to produce the product. From that into a full-scale plant to demonstrate the problems involved in commercial manufacture of a particular new product. Now, TVA organized a very competent staff of chemists, chemical engineers and operators to carry out this program at Muscle Shoals. When a process was developed, and the plant had the equipment to make it, TVA would obtain a patent on the particular process and would issue licenses to private industry to use it. I think that some 500 licenses of patented processes have been issued by TVA for use of patented processes. These are all published in the technical literature and are demonstrated to the members of the fertilizer industry who wish to take advantage of their use, which has been a general practice.

MR. BASS: (Cont'd.) Now, I am going to refer to one of the earlier problems of the TVA. This was that the fertilizer industry was very critical of TVA's role in carrying out this fertilizer development. There was quite a public controversy engaged in about the TVA's role. It was interesting to recall the first meeting that we arranged at Muscle Shoals with the leading manufacturers in the fertilizer industry. We sat around the table to describe what we had done, and then showed them through the laboratories how the work was carried out and what had been accomplished and the test results of fertilizer use by these farmers. The TVA demonstrations set a pattern of use and thus created a market which has been very profitable to the private fertilizer industry, as it should be. But the earlier meetings were somewhat of a controversial nature, and the fertilizer industry was skeptical of what TVA intended to do. That is, they would pose the question, "Well, are you proposing to monopolize the nitrogen industry and the phosphate industry?" We made it clear that our role was research and the bringing about of the testing of these products and to have the more efficient fertilizer products generally adopted for use in the industry and by farmers in general. Now, one of the channels that TVA used in marketing its product which it had to produce on a large enough scale to get accepted use, was farmer cooperatives all over the country. The TVA set up a marketing arrangement with the farmer cooperatives and through some 9,000 outlets made the fertilizer available to farmers. Once they had begun to buy it and use it, the market was created in a wide-spread fashion.

Now, I have discussed fertilizers in their role in the bringing about the adjustment of agriculture on Tennessee Valley farms. One of

MR. BASS: (Cont'd.) the important parts of any farm (and certainly an important resource in the Tennessee Valley) is the forest resource. The sheer fact that more than one-half of the area of the Tennessee Valley watershed is in forests, emphasizes the importance of forestry. The farm woodlot was generally neglected in farm management because it was used as a source of fire wood and not thought of as an income producer. It needed care and management as any other crop on the farm. So, as a part of the farm planning we enlisted the forestry agencies of the state universities and of each state government that was concerned with fire prevention. We assisted in the organization of this group into a composite working organization to improve and protect the forestry resources in the Tennessee Valley. There has been an enormous increase in employemant in forest industries, an increase in the value of the forestry resource, and there's been wide-spared re-forestation of those parts of the farm and some non-farm areas that should be placed under sustained yield forestry management. Sustained yield management, as you know, is the process by which you first protect your forest from fire and from grazing. Then you can cut out what is commonly called "weed trees" and leave the more promising stock more room to grow. Then you harvest the forest resource at the time when its growth has completed a cycle. Forestry has now become an important adjunct in farming, and in recreation, and in water control on the land, and is a part of the coordinated activity.

Let me say one other thing about the test-demonstration farms. One of the basic concepts where the test-demonstration farm differed from any other previously used in education as an educational device in agriculture was that there was brought together on a single farm all of the scientific contributions that had been developed through research in cropping, in

MR. BASS: (Cont'd.) livestock, in food preservation, and in poultry and home management. All of the enterprises on the farm were carried out according to the best scientific and technical know-how that the college research stations and experiment stations had been able to develop. That was all brought to bear on a single farm, and it was a departure in educational practices up to that time in agriculture. That is, in the past someone would go into sheep farming or someone would go into poultry raising or some other specialty, but rarely this complete integration of scientific knowledge in all of those activities that contributed to a total farm enterprise.

Well, at this point I would like to go back if you think appropriate, Dr. Crawford, to talk a little about the administration of TVA. At the outset the Board members divided among themselves the responsibilities of TVA. Each Board member thus acted as the administrator for his portion of the program. That is, Dr. Arthur Morgan, more or less, assumed the title of chief engineer and directed the engineering organization.

DR. CRAWFORD: At what time and how was this division agreed to?

MR. BASS: Well, that is what I'd like to describe. The original division was agreed to in one of the earlier meetings. There was a little list of activites that was presented to the Board at one of the earlier Board meetings, in which the division was proposed. I'm not sure who drafted it. I think perhaps that Dr. Arthur Morgan did it, but the list was passed around to the other two directors. They agreed, with the help of the staff, which had begun to be assembled, as to how the activities would be divided. I mentioned that Dr. Arthur Morgan took over the administration of the engineering aspects, the control of water in the river channels. At that time, the forestry department was still a part of the activities that he

MR. BASS: (Cont'd.) thought that he would like to oversee. Later the forestry work was transferred to Dr. Harcourt Morgan's group as a part of the water control on the land. But Dr. Arthur Morgan had the responsibility for water-control planning, for the directing of the planning and designing of the dams that were proposed for construction in a series, for the creation of a construction organization that would carry out the construction of dams, and for planning the navigation channel for the canalization of the river for a nine-foot navigation depth.

Mr. Lilienthal took over in the staff responsibility for legal work in the Authority and the planning for the development and marketing of the electricity produced as a by-product of the development of the dams and reservoirs. I want to emphasize that electricity, under the Act, has always been considered a by-product. But as Senator Norris so well expressed it when he would come down to make talks, that "electricity was the paying partner of the Authority." And it certainly has turned out to be that. So, Mr. Lilienthal had the responsibility for planning and making studies of how much electricity would be used, how it could be marketed, what the rate structure would be. Dr. Harcourt Morgan assumed responsibility for the use of the laboratories at Muscle Shoals for developing programs for agriculture and forestry readjustment in the Valley to "control water on the land," as he called it. As a part of that was the development of small industries that would demonstrate, as in the case of fertilizers, the processing of new farm products available in a diversified agriculture where small grains and livestock played such a prominent role. Quick freezing and meat processing became one of the challenges to help achieve

MR. BASS: (Cont'd.) better use and a better income for farmers. I might add that this program on small industry development was also carried out with the engineering staffs of the land-grant colleges as a part of their research. That is, TVA didn't build industrial research laboratories, but would cooperate with the college and would furnish a substantial part of the funds for staffing and carrying out an industrial planning program.

Well, coming back to the question of organization, as one might expect three independently-minded men as these Board members were, disagreed on various occasions about different things. All was not placid and peaceful in the early Board meetings of the TVA. The Board members felt that since the Act of Congress made it clear that the Board was to act with overall responsibility, each became a little concerned about the complete delegation to any one member for any one responsibility or activity. I know that that was a very great concern to me, because I had come out of the typical city-manager type of organization in which the lines of responsibility were well-defined and centered in a strong executive, and TVA did not have a single strong executive. A temporizing attempt was made by mutual agreement by the Board in which there was established an office of coordinator. A very capable man was brought in to fill this place, Mr. John B. Blandford, who had been safety director in the city-manager organization at Cincinnati, Ohio. Blandford did an excellent job to pull together a functioning and a well-organized type of program. I joined in discussion with him of the organization enthusiastically, because we both had similar backgrounds in city management. It was not long until his office evolved into the general manager's office for the Authority. The Board was then able to act to establish policy and program, with all of the administration carried out under the direction of

MR. BASS: (Cont'd.) the general manager, the first general manager being Mr. Blandford, whom I mentioned.

That called for a re-distribution of functions. Important offices were set up. First there was the office of Chief Engineer. A Chief Engineer was appointed to have control of all of the engineering functions that hd to do with the development of water in the rivers. There was a Department of Water Control Planning, a Department of Design, and the Department of Construction. The Chief Engineer had strong department heads in each of these departments. He was responsible for their administration. Similarly, in electric power, an office of Power Manager was set up. Julius Krug, or "Cap" Krug, as he was known, was the first Manager of Power. He was a strong executive, and had departments under him for the power planning, power operations and power development. I was appointed Chief Conservation Engineer with three departments with strong department heads reporting to me; that is the Department of Chemical Engineering headed by Dr. Harry Curtis who was a very able chemical engineer, and who later became a member of the TVA Board; the Director of the Forest Relations Department, who was a Mr. Willis T. Baker, an outstanding forester of high professional achievements; and the Department of Agricultural Relations with Mr. J. C. McAmis, who was recruited out of the University of Tennessee extension staff.

TVA then took on a very different administrative aspect, and procedures of the Board became very much more organized with the general manager presenting the program to the Board and making recommendations. This made it possible for continuity of work in the absence of a Board member. In the past each Board member had had a major assistant. Those of us who had been major assistants, were moved down into the organization, reporting

MR. BASS: (Cont'd.) to the General Manager. In addition to these three, which I might characterize as strong operating offices, there were the usual offices of the legal staff, the comptroller staff, personnel staff, and other operating and housekeeping divisions. So TVA took on an aspect of well-know, Board and General Manager type that has prevailed ever since and is likely a very effective type of organization.

At this point I would like to reminisce a little, Dr. Crawford, if I may, about some of the things that I think have contributed so much to the success of TVA. I think, to begin with, that timing was important. That is, TVA was created at a time when our region of the Tennessee Valley was certainly flat on its back. We found that we could get cooperation from the people in a program of this sort readily. That is, there was a strong response by the people of the region to the opportunity that this agency seemed to offer. Confidence on the part of local people was enhanced and very important and I think vitally, by the President having selected Dr. Harcourt Morgan to be one of the Directors. Dr. Morgan had wide acquaintance and was widely respected in the Tennessee Valley. People responded to his leadership. One of the little things that he did, for instance, was to work with the citizens' organizations in familiarizing the people in the Tennessee Valley region of what the program was about and what their opportunities could be. There was an association actually formally put together with Bill Manier (who was a past president of International Rotary and had wide acquaintance over the South) called the Tennessee Valley Association--the same initials as the TVA. Association membership comprised leaders in the various communities who were asked

MR. BASS: (Cont'd.) to meet and to make suggestions and enter into discussions, as to what the TVA was all about and how it would operate. So, in addition to this educational approach through to the farmer community that I have described, there was a general intensive effort to familiarize residents of the Valley with the program and how they would cooperate.

Dr. Morgan led the Board in emphasizing that TVA was not a superstate type of organization, telling people what to do, but that the programs had to be developed through citizen participation. People and organizations were asked to come forward with suggestions of programs that they would like to see carried out in their communities for general economic and social development in the Valley.

Another important asset that TVA had, in addition to its timing, was that it had the full support of the President of the United States and of Congress. That is, there was no question aboutthe backing of the national administration in carrying out the TVA program. Two Sections of the Act were very vital in this connection. I believe that these are Section 22 and Section 23 that directed the Board to make surveys and studies of the Valley resources and their need for development, and to recommend to the President and to the Congress the carrying out of these programs. Of course, TVA took that admonition and direction seriously and did formulate and recommend a number of programs for the development of the region.

Another very important policy decision, I think, that stemmed from a provision in the Act was that the staff would be selected without political considerations. This was scrupulously observed by the TVA, and to the best of my knowledge no political appointments were made. I joined the organization early in its organization, and I personally experienced

MR. BASS: (Cont'd.) the recruiting process. It was thrilling to me that we could pick out whom we considered the best-qualified person, and because of the economic depression that was country-wide, we could nearly always attract that person to the TVA; although, salary was not greater than the run-of-the-mill salaries in that region. People were largely available because of the slow down in economic activity in the country. When I think back of those stalwart men that we were able to recruit and put together on our team I think that this policy of recruiting solely because of abilities had more to do with the success of TVA than any other single thing.

I hope that I have brought out that much of TVA's program was experimental in nature. That is, we were doing things that had never been done that way before. In fact, the strength of the TVA program, (which was one of outstanding strength) was that all of these activities were carried out in combination or integration, as we more usually referred to it. For example, consider the actual work in putting the flow of the Tennessee River under control. When you think of it in concept, it's simple. You build reservoirs big enough to hold the runoff of the river, and then to release the water through the reservoirs and dams and regularize the uniform flow. Of course, it's obvious that in using the water resources of the river for that purpose, you get the maximum amount of electric power generation. This is to say nothing of the enormous amount of savings from uncontrolled flood damages that had been so disastrous to such big areas of the Tennessee Valley over so many years prior to TVA. The control of the Tennessee River enables TVA to shut off that river during floods from flowing into the Ohio and Mississippi and has had an enormous affect on reducing the downstream floods in areas that had previously been affected by water

MR. BASS: (Cont'd.) flowing out of the Tennessee. It just makes sense to build the engineering devices that control our major rivers in that manner.

Parenthetically I might say that this experience has had an international contribution. This experience was the cause of my being asked to accept a job at the World Bank to participate in the planning of a similar development of the huge Indus River system in India and Pakistan. I was asked to come to the World Bank to assist General Wheeler in his work as the coordinator of the engineering planning of this program which has come to a successful realization, resulting in a treaty between those two countries. The concept of developing the water resources in a river system for their optimum use is illustrated in the Indus Basin water resource development program. The concept really started with the Tennessee Valley program of demonstrated management of a water control program.

A lot of things in the early days of TVA were experimental, For example, we recognized another important resource as fisheries. Prior to TVA, the main experience in fisheries development had been that of the Fish and Wildlife Service of the U. S. Department of Commerce. Different states had had some concern with fishery resource, mainly regulatory. We realized that if we changed the rivers from shallow and swift-flowing streams into deep reservoirs, we would change their complete biological environment, and that would mean that existing species of fish would be entirely changed, because the environment would be so different. We recognized that we had a responsibility, because fishing in that area had always been a favorite recreational activity and an important source of food for people in the region. So we decided that we would build fish hatcheries to

MR. BASS: (Cont'd.) stock the reservoirs with the fish species that would thrive under the new conditions. As a part of my own responsibilities in the Forestry Relations Department, the fisheries staff was organized to carry out this research and development. We decided that we might as well do it on an adequate scale, so we built two fish hatcheries--one of them the largest in the world. It was built in the lower reaches of the Valley, and the other smaller one adjacent to the Norris Dam to serve the headwater storage reservoirs. We undertook the propogation of fisheries to stock the reservoirs, and we did.

Very soon, though, through meticulous research, we made an astounding discovery. I believe that this is another time that TVA has led the national experience. By being able, through the controlled operation of the dams, we could control the reservoirs to a specific level during critical periods, such as when the fish spawning takes place. We found that we could make these reservoirs natural hatcheries instead of having to resort to supplemental fish hatcheries. So, as a result of that, these beautiful fish hatcheries have been abandoned because they were no longer needed. But they did serve a very important purpose. Now, through this integrated operation for the use of the water and all othernatural resources in the region, a schedule is made out and reservoirs are programmed to operate at fixed different levels during different period of the year when water temperatures and other conditions are right for the natural spawning of the fishery species. As a result of that, TVA was able to recommend to the state agencies controlling game and fisheries resource that they could completely eliminate the close season on fishing. That is, our biologists found that more fish die of old-age, so to speak, than were caught.

MR. BASS: (Cont'd.) So now the Tennessee Valley is a virtual fisherman's paradise, by having these enormous fishery resources so adequately developed. Well, that's just an illustration of some of the experimental approaches that we planned and made. There are a number of other areas in which that was done.

Tree crops was a part of the farm woodland development. We introduced new species, and particularly have fostered the development of walnut; walnut being such a valuable species of timber. Another program that TVA was a contemporary in developing, and certainly it was a natural outgrowth, is the moving of intensive water control practices to smaller watersheds. The generalized agricultural readjustment has had certain effects, but if the agricultural and forestry development is intensified on a small enough scale so as to have complete control, you can get almost a pristine development of streams and lands. A number of watersheds have been selected, and the farmers in those have agreed to do more than is done ordinarily by the farmers in the Valley. In these intensively developed watersheds, the maximum development of forestry and land cover is used in bringing about a very intensive small watershed development.

I might touch a little bit on some of our earlier "troubles" (shall I call them) in TVA. I mentioned earlier, I believe, that where you have a Board with so much responsibility, and each member of the Board felt his responsibility very strongly, that there are sure to be differences of opinion. Some of those are compounded by personal attitudes, and we found that was true in TVA. That is, the members of the Board were guided by different personal philosophies. Those personal philosophies would sometime find a way into discussions and would be challenged by other members of the Board. There gradually developed a rift between Arthur Morgan and

MR. BASS: (Cont'd.) Dave Lilienthal, growing out of, I'm sure, a philosophical attitude on the part of each. Mr. Lilienthal being a man of very sharp mental abilities and characteristically a lawyer with very strong ambition, strong controversies developed in Board meetings that sometimes hampered the work of TVA. In fact, some of the Board meetings were almost shouting sessions, and I use that word guardedly. Sometimes the conclusion of the Board meetings would not satisfy anyone, because of the atmosphere in which decisions were carried out. Sometimes the Board members would have second thoughts after getting out of the Board meetings. On more than one occasion the chairman, Mr. Arthur Morgan, would not carry out things that the Board had decided on. This would naturally raise a parliamentary question and widen even more the gap in cooperation among the Board members.

Mr. Blandford was an enormous help in ofsetting this, and very often he would discuss proposals with the Board members before meetings, and would have a pretty well agreed program before the Board. The Board became somewhat more formal in considering the proposals of the staff which were submitted through the General Manager. I might say that this didn't affect the technical or operational aspects of the TVA in any way, but it did create a poor working environment. So much so that Dr. Harcourt Morgan, who had a deep interest in the cooperation of the Board and of the things that it was responsible for carrying out, finally joined with Mr. Lilienthal in recommending to the President that a new member be appointed in place of Mr. Arthur Morgan. As you will recall, as I am sure that it is well-documented in other people's discussions, that the President asked Mr. Morgan to retire because of "contumacy," which brought an unusual word into wide usage in the TVA area.

MR. BASS: (Cont'd.) Well, Dr. Crawford, you may cut out any part of this that you wish. I apologize for rambling so. If you can think of anything that I can clarify that I have referred to, I will be glad to attempt it. Anyway, it's been a very great privilege to discuss this with you, and I hope that I have brought out the fact that TVA is a good deal.

DR. CRAWFORD: You have added some valuable additions to the record, Mr. Bass, and I'll ask a few questions now, if I may. To what do you contribute this remarkable success in the TVA through the 1930's? What do you think were the main factors in its organizing from 1933 to its level of success, say, at the beginning of World War II?

MR. BASS: First I think that confidence on the part of the people of the area in the program had a great deal to do with it. That is, the dams that were built were technically sound and economically built. The relation with the people in the Valley (and I spoke earlier of the widespread acceptance of the leaders of the Valley and leaders in industry and education and in government), which I think was largely attributable to Dr. Harcourt Morgan's leadership and the confidence that the people had in him. In addition to that, the TVA was very fair in its relations and in its dealings with the trades and labor organizations. We relied heavily on the labor organizations to train and furnish qualified people to carry out the trades and labor operations of the agency. Then there was the fact that timing was a very important contributor to the success of TVA. The widespread use of electric power has meant a lot not only to the comfort of people in the region, but to their economic development. And the fact that we could build these dams in a period when construction costs on a dam were certainly much more reasonable,

MR. BASS: (Cont'd.) if you would use that word, than now. That is that TVA has an enormous capital asset in these dams that were built in a favorable construction period. Electric power use pyramided though the policies that TVA chose to adopt for bringing electricity to the people at a reasonable cost, and yet without loss to the federal treasury. The power operations of TVA were meticulously segregated from its developmental aspects and kept on a business basis. It has been a sound and efficient operation, and TVA has been able to produce power and market it to the people for widespread use. Because of the widespread use, the power rates have been kept at a very reasonably low level. Power is always worth more than it costs. The widespread availability of electric power, and the realization on the part of the people who use that power that their power system is efficiently and economically operated has contributed to the acceptance of TVA. So when you say, "To what do you contribute the success of TVA?," success is always the result of an evaluation. Evaluation in TVA's case started with the people of the region themselves and from their full familiarity with it.

DR. CRAWFORD: Do you know why you were selected for a very important position in TVA? Why did that selection take place? Did Mr. Harcourt Morgan make it?

MR. BASS: Dr. Harcourt Morgan told me that he had discussed hisneed for his principal assistant with the other members of the Board, and, as he expressed it, "They fully agreed with my selection." I had had a long acquaintance with Dr. Morgan. I had known him when I was a young University student. I had met with him frequently during my career as Highway Commissioner and as city manager. I felt that I had a full appreciation of his talents and his attitude. I know that for my part, on accepting the place, I felt that it was a rare opportunity to get to work with him and

MR. BASS: (Cont'd.) with his associates who had been appointed to the TVA Board. In fact, those are the specific words that my wife and I discussed when I told her that I had been offered the post. She and I agreed, and we set a limit that I would work for TVA for not more than ten years. Perhaps this was selfish, that I felt that I would gather a character of training that I could have gotten nowhere else, plus the fact that this was a stimulating program and I would like to be in it and participate in it.

But then the ten years were strung out to eighteen before I decided that it was time to retire and to take another job.

DR. CRAWFORD: Did you know either one of the other two Directors--either personally or by reputation before you made this decision?

MR. BASS: No, I began, when the names were mentioned in the press to inform myself about them, and that was my earliest acquaintance with either of them.

DR. CRAWFORD: Do you know why the President appointed these three Board members?

MR. BASS: Well, I really don't. Dr. Arthur Morgan was a rather natural selection because he had pioneered in the Miami River Conservancy and Development for Flood Control in the Miami River Valley in Ohio. That had significant elements of the kind of thing that we wanted to do in TVA. The flood control conservancy in the Miami River Valley area was quite a different kind of problem, however. That was purely for flood control. No power or other conservation involved, but Dr. Morgan gained considerable recognition for his contribution to that program. Mr. Lilienthal was known for his activities in the public utilities field in Wisconsin. I think that Dr. Harcourt Morgan's appointment was (and it seems that I heard some allusion to this) that the President wanted one man who had the absolute confidence of the people of that area.

DR. CRAWFORD: Do you know anything, Mr. Bass, about any suggestion to appoint you to the Board of Directors?

MR. BASS: Well, I suppose that anyone of my age working in an organization at that time, would have some ambition to perhaps be appointed to the Board. I know that when Dr. Harcourt Morgan asked me to come to work with him, and on numberous occasions he made it clear, that he was putting me under intensive training to be his successor. I am afraid that I shouldn't attribute myself with the kind of abilities that that would require, but that was suggested by Dr. Morgan. Then, somewhat later when this controversy among the Board members was at such a high pitch, Mr. Arthur Morgan, from what he said to me, felt that the President was going to remove Mr. Lilienthal instead of him as a member of the Board and appoint someone in Mr. Lilienthal's place. It was at that time that Mr. Arthur Morgan suggested that he would like to recommend me to the President to take Mr. Lilienthal's place. Of course, that suggestion, coming when I was an assistant to Dr. Harcourt Morgan, placed me in a rather trying position because I felt that I could not discuss the possibility of my possible appointment with Dr. Arthur Morgan without advising Dr. Harcourt Morgan, which I immediately did. We made it clear that I could not be available, or would not make myself available, as long as Mr. Lilienthal was on the Board. Dr. Harcourt Morgan and Mr. Arthur Morgan both agreed that if there were a vacancy that I would be considered to be recommended to the President. But when we made that statement that I could not be available as long as Mr. Lilienthal was there, Mr. Arthur Morgan then started to seek another possible candidate.

DR. CRAWFORD: Mr. Bass, you were very familiar with Tennessee before TVA was instituted, and I assume that you still have close contact with the region. What changes do you see from the beginning of the 1930's to the present time that you believe were caused by TVA?

MR. BASS: Well, it's a little difficult to separate and isolate the particular development that could be directly attributal to TVA. Some are obvious. That is, the enormous recreational industry that has developed around lakes. I think that is, of course, directly attributal to TVA. Another development that is reflected in the general well being of the Tennessee Valley community is the availability and widespread use of electricity. Of course, I did refer to a well-known fact, and that is that the power service area is not coincidental with the Tennessee Valley watershed area, because the power system is not susceptible to the limitations of the area in the same way that a watershed would be. In other words, you have to serve power according to logical lay-outs of transmission and distribution systems. This has resulted in the power area that TVA serves being about double the size of the Tennessee River watershed. The entire power service area already has benefitted from this widespread use of electricity. Now, it's hard to say that all of that is attributable to TVA. I think that the simple fact that per capita power usage in the TVA area is about double the national average indicates that it has at least been accelerated and intensified by TVA. There are industrial activities growing out of the availability of power, and very favorable freight rates prevail in the region.

I didn't touch on the fact that one of the bottlenecks that TVA tackled was the bottleneck of transportation and of what we, as an agency, considered unfair freight schedules on rail rates for the Tennessee Valley.

MR. BASS: (Cont'd.) TVA employed an outstanding transportation economist, Dr. Hayden Aldridge, who later became a Commissioner of the Interstate Commerce Commission. Dr. Aldridge, with his staff, produced studies that convinced the Interstate Commerce Commission that there should be a major readjustment of freight rates. Now the TVA area is not burdened in the marketing of its products through an unfavorable freight rate structure. I might say that priot to TVA the rates that were traditionally employed developed a lot from history. The historical economic pattern in the TVA area and in much of the South, favored the export of raw materials and the import of finished products. It was just the reverse of TVA's desire to bring about a favorable climate in which industry could develop in the Tennessee Valley region.

DR. CRAWFORD: Could you name a few of the personnel who were most important in the early development of TVA, other than yourself and the Board members?

MR. BASS: Well, I will stumble around over names, because I haven't thought of these fellows in a long time. Of course, the Board members themselves, which you have identified, and then on the next stratum I named John B. Blandford who came in as coordinator and stayed on as General Manager. Then I must pay tribute to Dr. Floyd Reeves, who was head of the Personnel Office, and his deputy, Gordon Clapp, who laterbecame General Manager and later a member of the Board. Dr. Reeves had strict rules about the professional recruiting of employees. Then there was Theodore Parker, who was the first Chief Engineer of the TVA, appointed immediately after the reorganization under a General Manager. His successor, Clarence Blee, was dauntless in the engineering profession and did a marvelous job. Both of them have since died, but they did a marvelous job in setting the high standard of engineering work in TVA. In planning, TVA recruited a man named Earle Draper, as head

MR. BASS: (Cont'd.) of our Department of Regional Planning. He was a very well-qualified part in the planning field. That is, the dams were not only made useful, but also attractive by the integration of planning into the dam design. We had a very talented architect, Roland Wank, who was able to give beauty to the structures that were built. This enhances the pleasure that people get from looking at them and doesn't detract from the land. I think that I mentioned Mr. Willis Baker, who was head of the Forestry Relations Department and McAmis who was head of the Agricultural Relations Department. I mentioned Dr. Harry Curtis who was head of the Chemical Engineering Staff and Director for that department. He later, as you know, became a member of the Board. His assistant, Mr. Arthur Miller, was appointed Chief Chemical Engineer when Dr. Curtis resigned to go back to teaching at the University of Missouri. Mr. Miller made a remarkable contribution, but he was picked off by one of the larger industrial complexes, the Rohm-Haas Company, and was made a vice-president. We lost his services. Charlie Young, who succeeded Arthur Miller, was another person who made a strong contribution. Stewart Harvey did a marvelous job directing the operations of that department. Jack Walthall was a scientist who developed a method of making aluminum out of the enormous clay deposits in the Tennessee Valley region. I could go on and on and on and name a lot of these fellows, and I'm sure that I've over-looked many.

DR. CRAWFORD: Mr. Bass, who was the person considered by Arthur Morgan for appointment to the Board after he learned you would not be available?

MR. BASS: Mr. John Neely. John was a head of our Reservoir Operations Staff. John had been in my organization when I was State Highway Commissioner, and I knew him well. He was a very able young man. He now works for the University of Tennessee as the manager of their properties.

DR. CRAWFORD: What changes, in general, did you see take place in the state highway system when you were on the Highway Commission?

MR. BASS: Well, you are opening up a subject about which I like to talk, but I'll try to be very brief. I joined the Tennessee State Highway Department when I first graduated from college. I was recommended by the Dean of Engineering, Dr. Dougherty, who had worked for the Tennessee Highway Commission in summer work in traffic counts and highway planning. So I took the lowest paying job in the Department, I guess, instrument man on surveying parties, and I had the very satisfying experience of, I believe, holding each of the jobs in the organization, resident engineer, supervisor of a construction project, assistant chief engineer, and then chief engineer. When the state government was reorganized under Austin Peay, who took office in 1922, he appointed a very able man to administer the department, a Mr. Creveling. He was a wealthy, retired, mining engineer. Mr. Creveling asked me to be his principal assistant. Later, when Mr. Creveling felt that he had served long enough, he recommended me to Governor Peay for appointment. The Governor appointed me as Highway Commissioner in 1925.

Perhaps no one could have been more fortunate in the time in which they served to direct the Highway program, because I was privileged to serve during that transition from muddy roads, or no roads, to roads. We made one crucial decision that I think has had more effect than any other single decision. That is, we decided that our main job wasn't just to build roads, but rather to get the traffic in the state to moving as smoothly, comfortably, and as safely as possible over the highways. So we decided to adopt the policy of putting maintenance first and construction second. In carrying out that policy we put out large equipment to shape up

MR. BASS: (Cont'd.) old roads and to put rock surfacing on them, and this made them travelable all year around. It is hard for people of your generation, Dr. Crawford, to realize that back then you couldn't drive from Nashville to Knoxville in one day. I think that I was one of the first people that ever did that, as well as being one of the first people being able to drive all the way from Memphis to Bristol in a day. But what made that possible was smoothing up these roads, getting the water off of them, and getting a hard, level surface of rock. As soon as traffic developed and as soon as we could afford it, we treated those roads with asphalt to keep the dust down. Well, that immediately made the Highway Department very, very popular and Governor Peay a very popular governor. I am very thrilled to have served during that period.

DR. CRAWFORD: Can you tell me, Mr. Bass, when you left TVA, and briefly, what you've done since then?

MR. BASS: As I mentioned a while ago, when I went to work for TVA I felt that I didn't want to spend all of my career there. My wife and I said, "Let's try it for ten years." TVA has a retirement system that made it possible for retirement at age 55. So having worked from 1933-1952, I became a 55'er. At the beginning of that year I decided that I would leave TVA when a challenging opportunity arose. Well, it just so happened that the World Bank was asked to use its good offices to help solve the problem of the use of the water resources of the Indus River system--one of the largest in the world (lying in the countries of India and Pakistan) following the partition of Pakistan and India. What had happened was that those responsible for the territorial division of those countries (in which the Muslims moved into one area and the Hindus into another) was that the

MR. BASS: (Cont'd.) international border was drawn down across the rivers, leaving the head waters in India and the down-stream portion where the main part of the water was used, in Pakistan. So, the World Bank was asked to supply the principles of river development to the development of the water resources in this huge region. This was the same principles we had used in TVA. The Bank, working with the engineers of India and Pakistan, carried out that job. It was a long, tedious job complicated by the feeling of strong nationalism on the part of the Pakistanis and Indians. Each government appointed a very competent team to work with us, and we did work out a development plan for the river. It has been put into affect; it has been agreed upon by the two governments in a treaty. The dams and transfer canals in this water distribution system have been completed or are about to be completed. The cost of the program has thus far been about a billion-and-a-half-dollars. The World Bank has been a custodian of those funds and has disbursed it for these projects.

When the engineering and planning phase was completed, the Bank asked me to stay on their staff. I became a member of the Public Utilities Staff, and later became the Assistant Chief of that Division where I served until I reached retirement age of 65 in 1960. But the Bank was, I guess, very short of engineers with adequate experience and asked me to stay on another year, and that became two years and eventually it became five more years before I actually retired. So I had a very thrilling experience of working in the World Bank organization, which, as you know, conducts international lending operations in under-developed countries. The World Bank is a very successful organization that finances itself through borrowings and makes a financial profit in its operations. I completed thirteen years of work at the World Bank after I left TVA.

DR. CRAWFORD: What are your plans for the future, Mr. Bass?

MR. BASS: Well, I thought that when I retired from the World Bank I would probably just enjoy life. I had had enough of international travel, having travelled over the world so much. I was approached at that time, after I had announced my retirement at the Bank and before I had actually retired, to come to work for the Agency of International Development. A. I. D. had just reorganized considerable of its activities and had shifted to a policy of making loans to the underdeveloped countries on concessional terms, rather than the earlier practice of furnishing assistance in the form of grants. I was added to the staff of the Agency under Mr. Harold Folk, who is my supervisor, to bring into the process of A. I. D.'s review of loans the experience we had gained at the World Bank. My job in A. I. D. is to review all the loans that the Agency makes and make comments and suggestions of their compliance with sound lending practices.

DR. CRAWFORD: After retirement from the Agency of International Development, do you expect to remain here or to return to Tennessee?

MR. BASS: Well, that's a question that hasn't been decided. I love Washington, and we have many friends here whom I've enjoyed being with. But Tennessee has its attractions. The fact that my son is an architect practicing in Nashville and has three charming granddaughters is one. For practical matters, Mrs. Bass and I decided that I will definitely retire at the end of this year, and then we will use the year 1970 to decide what we are going to do. I might add, to pick up an expression from Dr. Harcourt Morgan, who quoted the President of the University of Guelph in Canada, who was up in his eighties, as saying that "the tower of enchantment is still ahead of us."

DR. CRAWFORD: I would like to ask one last question, Mr. Bass. You apparantly learned a great deal in your career from Harcourt Morgan. I gather that he was something of a leader, if not an inspiration, for you. What are the most important things that you feel you've learned from your association with him?

MR. BASS: Well, I hope that I have profited from his example. Dr. Morgan was an inspiration to all of his associates who worked with him. He was the most unselfish man with whom I've ever been associated. There was his complete devotion to his work and his complete honesty and his complete trust on the basis on which he dealt with people. I would like to believe that I have profited from his example in those characteristics. I might say that my opinion is shared by many of us who worked with him during the TVA era so closely and before. I stated earlier that he was undoubtedly the most popular figure in Tennessee. He was well-loved by citizens from one end of the state to the other. During his career as President of the University he had gone out over the state saying that the campus of the University was the State of Tennessee. He wanted all of the citizens to share and to participate in it. Well, he brought that philosophy into his practices with TVA.

DR. CRAWFORD: Thank you, Mr. Bass, for your valuable contribution to the oral history of the Tennessee Valley Authority.

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